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WHAT IS *ALLOPERLA IMBECILLA* (SAY)?  
DESIGNATION OF A NEOTYPE, AND A  
NEW *ALLOPERLA* FROM EASTERN  
NORTH AMERICA (PLECOPTERA:  
CHLOROPERLIDAE)

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*Alloperla imbecilla* (Say) is the type-species of the genus *Alloperla* Banks (1906). It was described by Thomas Say from the Ohio River at Cincinnati but the description is very brief and does not include anything about the genitalia. Needham and Claassen (1925) redescribed what they thought was this species using specimens from New York because no type-specimen was available. Their description and figures of male and female genitalia served to fix the concept of *A. imbecilla* until now.

Recently while studying *Alloperla* specimens at the National Museum of Natural History it became apparent that two species were included under the name *Alloperla imbecilla* (Say). Since no type-specimen was known, as complete a study as possible was undertaken using most existing specimens. The results obtained indicate that a type-specimen does not exist and that the true *A. imbecilla* is restricted to the Ohio River drainage and nearby localities along the Allegheny Front. A second, previously undescribed species, is distributed all along the eastern portion of North America from Canada to the southeastern United States.

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*Alloperla imbecilla* (Say)

Figures 1-6

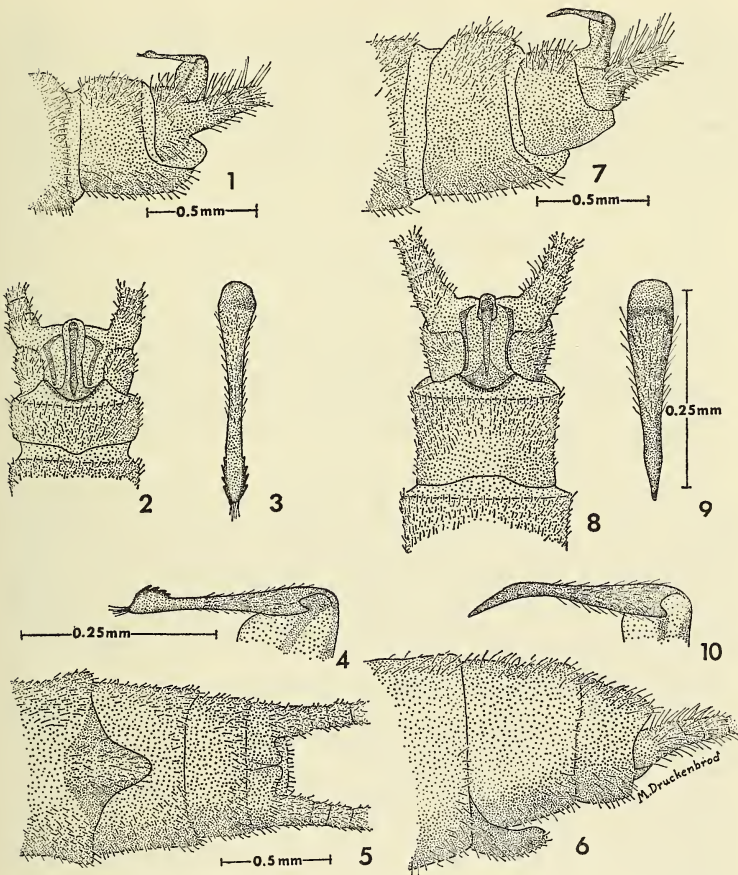
*Sialis imbecilla* Say, 1823:165.

*Perla imbecilla*, Hagen, 1861:31.

*Alloperla imbecilla*, Banks, 1906:175; 1907:13 (in part).—Claassen, 1940:186 (in part).—Walker, 1947:135.—Gaufin, 1956:323; 1964:40 (in part).—Illies, 1966:432 (in part).

*Male*: Macropterous. Length of forewings 7.5-8.5 mm; length of body 7-8 mm. General color light pale green (dirty white in alcohol); legs yellow; antennae brown; cerci yellow; head and pronotum yellow brown, eyes and ocelli prominent chestnut brown. Head as wide as prothorax; ocellar triangle equilateral; posterior ocelli slightly closer to eyes than to each other. Pronotum wider than long, with very faint rugose markings. Abdomen without dark dorsal markings; abdominal segments covered by dense hairs. Epiproct long slender and lightly sclerotized, basal  $\frac{2}{3}$  covered with hairs; dorsal aspect broadest at base and apex, narrowest at midline, lateral margins of apex serrated and heavily sclerotized, tip bearing numerous stout hairs which appear as a single spine under low magnification (Figs. 2 & 3); lateral aspect broad at base, tapering gradually toward apex, apical portion enlarged, bearing sclerotized serrations on dorsal margin, stout hairs plainly visible at tip (Figs. 1 & 4).

*Female*: Macropterous. Length of forewings 8.5-9.5 mm; length of body 8-9 mm. Color and general morphology similar to male.



FIGS. 1-6. *Alloperla imbecilla* (Say): 1, male terminalia, lateral; 2, male terminalia, dorsal; 3, epiproct, dorsal; 4, epiproct, lateral; 5, female terminalia, ventral; 6, female terminalia, lateral. FIGS. 7-10. *Alloperla atlantica* sp. nov.: 7, male terminalia, lateral; 8, male terminalia, dorsal; 9, epiproct, dorsal; 10, epiproct, lateral.

Subgenital plate formed from posterior median portion of seventh sternum, base broad,  $\frac{1}{3}$  width of sternum 8, tapering abruptly to narrowly rounded apex, extending over sternum 8 beyond midline (Fig. 5); lateral aspect slightly broader at base, width nearly constant to rounded tip, appearing as stout fingerlike projection (Fig. 6).

*Material:* Neotype, male, Ohio, Adams Co., Lower Twin Creek, Vastine Run, 10-V-1963, F. J. Moore, USNM #73053). Additional

confirmed records: NEW YORK: Tompkins Co., Newfield, 5-VI-1923, ♀, 1 ♂ (CU). OHIO: Adams Co., same data as neotype, 2 ♂ ♂ (OSU) (UK); Geauga Co., Stebbins Gulch, 20 to 27-V-1972, M. A. Tkac, 12 ♂ ♂, 11 ♀ ♀ (USNM). VIRGINIA: Bath Co., Blowing Spring Cmpg., 8 miles W. Warm Springs, 18 to 20-V-1963, Flint & Field, 1 ♂, 1 ♀ (USNM). WEST VIRGINIA: Summers Co., Bluestone State Park, near Hinton, 21 to 22-V-1963, Flint & Field, 1 ♂, 4 ♀ ♀ (USNM).

***Alloperla atlantica*, new species**

Figures 7–10

*Alloperla imbecilla*, Banks, 1907:13 (in part); 1908:150.—Needham and Claassen, 1925:125.—Procter, 1938:53.—Claassen, 1940:186.—Harden, 1942:319.—Procter, 1946:54.—Sprules, 1948:74.—Ricker, 1948:411.—Harden and Mickel, 1952:59.—Brinck, 1958:56.—Gaufin, 1964:40 (in part).—Illies, 1966:432 (in part).—Hitchcock, 1968:43.—Ricker, et al. 1968:1116.

*Male*: Macropterous. Length of forewings 7.5–8.5 mm; length of body 6–8 mm. General color and morphology similar to *A. imbecilla*. Epiproct long slender and lightly sclerotized, basal  $\frac{2}{3}$  covered with hairs; dorsal aspect broadest at base, tapering gradually to pointed apex, tip rounded and naked (Figs. 8 & 9); lateral aspect tapering from broad base to pointed tip, apical  $\frac{1}{3}$  naked and often slightly bent downward (Figs. 7 & 10).

*Female*: Macropterous. Length of forewings 8–9 mm; length of body 8–9.5 mm. Color and general morphology similar to male. Subgenital plate formed from posterior median portion of seventh sternum, base broad,  $\frac{1}{2}$  width of sternum 8, tapering abruptly to narrowly rounded apex, extending over sternum 8 nearly to posterior margin; lateral aspect slightly broader at base, width nearly constant to narrowly rounded tip, appearing as stout fingerlike projection with slightly pointed tip.

*Material*: Holotype, male and allotype, Maryland, Frederick Co., Fishing Creek, Mountandale, 4-VI-1958, P. H. Freytag (USNM # 73054). Paratypes: CANADA: NEW BRUNSWICK: York Co., Fredericton, 12-VI-1933, J. L. McDunnough, 4 ♂ ♂, 6 ♀ ♀ (CNC). NOVA SCOTIA: Cape Breton Co., Baddeck, 23-VI-1936, J. L. McDunnough, 1 ♂ (CNC); Baddeck Forks, Cape Breton Island, 30-VI-1936, J. L. McDunnough, 1 ♀ (CNC). Queens Co., White Point Beach, 23-VII-1934, J. L. McDunnough, 1 ♀ (CNC). ONTARIO: Nipissing Dist., Costello Lake, Algonquin Provincial Park, 7 to 10-VI-1939, W. M. Sprules, 2 ♂ ♂, 6 ♀ ♀ (INHS). Parry Sound Dist., Kearney, 22-VI-1926, F. P. Ide, 1 ♀ (CNC). QUEBEC: Brome Co., Knowlton, 20-VI-1927, G. S. Walley, 1 ♂ (CNC); 4-VI-1936, 1 ♂ (CNC); 12-VI-1928, G. H. Fisk, 1 ♀ (CNC). Gatineau Co., Masham Hills, 5-VI to 1-VIII-1935, F. P. Ide, 3 ♂ ♂, 5 ♀ ♀ (ROM); 27-VI to 8-VIII-



1935, G. E. Bucher, 11 ♂♂, 6 ♀♀ (ROM). Huntingdon Co., Covey Hill, 15 to 25-VI-1924, G. S. Walley, 3 ♂♂, 2 ♀♀ (CNC). Montmorency Co., Montmorency River, 14-VII-1958, R. Malouin, 1 ♀ (CNC); Barriere Brook, Laval, 28-VII-1958, 1 ♀ (CNC); Goudreault River, Laval, 14-VII-1958, R. Malouin, 1 ♂, 1 ♀ (CNC); Dauphine River, Orleans Island, 13-VI-1957, R. Malouin, 1 ♀ (CNC); La Fleur River, Orleans Island, 10-VII-1958, R. Malouin, 1 ♀ (CNC); Moulin River, Orleans Island, 6-VII-1958, R. Malouin, 2 ♂♂ (CNC); St. Patrick Brook, Orleans Island, 26-VI-1957, R. Malouin, 1 ♂, 2 ♀♀ (CNC); 24-VI to 4 VIII-1958, 15 ♂♂, 10 ♀♀ (CNC); 4-VI to 10-VII-1959, 33 ♂♂, 15 ♀♀ (CNC); 28-VI-1960, 2 ♀♀ (CNC). Saguenay Co., Nabisipi River, 4-VII-1962, G. Shooner, 3 ♂♂, 5 ♀♀ (UMC). Terrebonne Co., du Diable River, Mont Tremblant Provincial Park, 28-V to 4-VIII-1959, A. Robert, 9 ♂♂, 36 ♀♀ (UMC); 25-VI-1960, 1 ♀ (CNC); Mont Tremblant Provincial Park, 3 to 18-VI-1958, A. Robert, 15 ♂♂, 23 ♀♀ (UMC); 1960?, 11 ♂♂, 11 ♀♀ (UMC). Ungava, Great Whale River, 7 to 20-VII-1949, V. R. Vockeroth, 2 ♂♂, 5 ♀♀ (CNC). UNITED STATES: GEORGIA: Rabun Co., Burton, 21-V-1911, J. C. Bradley, 1 ♂, 1 ♀ (CU). ? Co., S. Georgia, ?-V-1931, P. W. Fattig, 1 ♂ (CU). MAINE: Hancock Co., Bar Harbor, Mt. Desert Island, 13 & 14-VI-?, C. W. Johnson, 3 ♂♂, 1 ♀ (BU). MARYLAND: Baltimore Co., Baltimore, 16-V-1938, E. G. Fisher, 2 ♂♂, 1 ♀ (ANSP). Frederick Co., Fishing Creek, Mountindale, 4-VI to 1-VII-1958, P. H. Freytag, 6 ♀♀ (UK); Little Hunting Creek, 25-V-1958, P. H. Freytag, 1 ♂ (UK). MASSACHUSETTS: Franklin Co., Johnsons Brook, Colrain, 16-VI-1968, C. H. Nelson, 1 ♂ (CHN). Hampshire Co., Westfield River, Rt. 9, Cummington, 17-VI-1965, F. R. Holbrook, 1 ♂, 1 ♀ (CHN). MICHIGAN: Marguette Co., Marguette, 25-VII-?, Hubbard & Schwarz, 1 ♂ (USNM). MINNESOTA: Cook Co., ?, 5-VIII-1939, H. T. Peters, 1 ♂, 3 ♀♀ (UM); Kimball Creek, 22-VII-1948, P. H. Harden, 2 ♂♂, 2 ♀♀ (UM); Temperance River, 6 miles from Lake Superior, 22-VII-1948, P. H. Harden, 3 ♂♂, 3 ♀♀ (UM); Kadunce Creek, Grand Marais (dead in spider web), 8-VIII-1929, C. T. Schmidt, 3 ♂♂, 4 ♀♀ (UM) (INHS); Devil's Track River, Grand Marais (dead in spider web), 7-VIII-1935, C. T. Schmidt, 6 ♂♂, 3 ♀♀ (UM) (INHS); Devil's Track River, Gunflint Trail, 11-VI-1969, H. Bell, 1 ♂, 4 ♀♀ (USNM); Little Devil's Track Creek, Grand Marais, C. T. Schmidt, 15 ♀♀ (UM) (INHS). Lake Co., Stewart River, Boy Scout Camp, N. Two Harbors, 9-VI-1966, H. Bell, 1 ♂, 1 ♀ (USNM); 20-VI-1966, 1 ♂, 4 ♀♀ (USNM). St. Louis Co., French River, 22-VII-1948, P. H. Hardin, 2 ♀♀ (UM). NEW HAMPSHIRE: Coos Co., Imp Creek, Pinkham Notch, near Mt. Washington, 23-VI-1941, Frison & Ross, 1 ♀ (INHS); Gorham, 23-VI-1941, Frison & Ross, 1 ♂, 1 ♀ (INHS). Grafton Co., Franconia, ?, A. T. Slosson, 1 ♀ (AMNH); Bog Brook, North Woodstock, 21-VI-1941, Frison & Ross, 1 ♀ (INHS); Whitcherville Brook, near Benton, 21-VI-1941,

Frison & Ross, 2 ♀ ♀ (INHS). Merrimack Co., Ragged Mountain Brook, East Andover, 16-VI-1973, D. N. Alstad, 3 ♂ ♂, 3 ♀ ♀ (USNM). NEW YORK: Albany Co., Catskill Creek, Rt. 145, near Cooksburg, 16-VI-1964, Nelson & Root, 1 ♂ (CHN). Essex Co., Alcohol Brook, Adirondacks Lodge, 1-VII-1923, ?, 1 ♂ (CU); trib. Au Sable River, Keene, 20-VI-1941, Frison & Ross, 1 ♂ (INHS); Tahawus, 20-VI-1941, Frison & Ross, 1 ♂ (INHS). Fulton Co., Trammel Brook, near Stratford, 18-VII-1935, ?, 1 ♂ (CU). Greene Co., Ashland, Rt. 23, 19-VI-1964, Nelson & Root, 2 ♂ ♂, 1 ♀ (CHN). Hamilton Co., Sacandaga River, Sport Island, 14-VI-1910, Alexander, 1 ♂, 1 ♀ (MCZ); Bear Brook, near Blue Mt. Lake, Adirondack State Park, 19-VI-1941, Frison & Ross, 3 ♂ ♂, 1 ♀ (INHS). Tompkins Co., Ithaca, 1 to 7-VII-?, N. Banks, 1 ♀ (MCZ); 9-VII-1924, ?, 1 ♂, 5 ♀ ♀ (CU). Ulster Co., Chichester, Rt. 214, 16-VI-1964, Nelson & Root, 2 ♂ ♂, 1 ♀ (CHN). NORTH CAROLINA: Swain Co., Smokemont Cmpg., 11-V-1944, Frison & Ross, 8 ♂ ♂, 1 ♀ (INHS). Transylvania Co., Whitewater River, Rt. 171, 18-V-1970, O. S. Flint, Jr., 2 ♂ ♂, 1 ♀ (USNM). PENNSYLVANIA: Sullivan Co., Little Loyalsock Creek, Dushore, ?, 1 ♂ (UU). SOUTH CAROLINA: Pickens Co., Six Mile Creek, Hwy. S-160, 1-V-1968, P. H. Carlson, 1 ♀ (USNM). Oconee Co., Chattooga River, Rt. 28, 8-V-1969, J. C. Morse, 1 ♂ (USNM). TENNESSEE: Monroe Co., Tellico River, 21 miles SE, Tellico Plains, 18-VI-1969, W. L. Peters, 4 ♂ ♂, 1 ♀ (UU) (USNM). Polk Co., 12.8 miles N. jct. Rt. 30/64 on Rt. 30, Cherokee National Forest, 9-V-1970, C. H. Nelson, 1 ♂ (CHN); .6 mile N. Parksville Lake Cmpg., Rt. 30, Cherokee National Forest, 11-VI-1970, C. H. Nelson, 2 ♂ ♂ (CHN). Sevier Co., Elkmont Cmpg., 12-VI-1935, H. H. Ross, 1 ♂ (INHS); LeConte Creek, Gatlinburg, 14-V-1939, Frison & Ross, 4 ♂ ♂ (INHS); Fighting Creek Gap, Gatlinburg, 27-V-1934, T. H. Frison, 1 ♀ (INHS); 15-V-1939, Frison & Ross, 1 ♂ (INHS); Fork of Little Pigeon River, Gatlinburg, 27-V-1934, T. H. Frison, 6 ♂ ♂, 9 ♀ ♀ (INHS); Little Pigeon River, Gatlinburg, 29-V-1934, T. H. Frison, 2 ♂ ♂, 1 ♀ (UU); 12-VI-1935, H. H. Ross, 5 ♀ ♀ (INHS); Gatlinburg, 14-V-1939, Frison & Ross, 1 ♂, 1 ♀ (INHS); 13-VI-1940, T. H. Frison, 1 ♂, 1 ♀ (INHS); 11-V-1944, Frison & Ross, 1 ♂ (INHS). VERMONT: Orange Co., Waits River, West Topsham, 21-VI-1941, Frison & Ross, 1 ♂ (INHS). Windham Co., Townshend, 16-VII-1934, H. Kahl, 1 ♀ (CM).

There are also literature records (as *A. imbecilla*) from Newfoundland (Labrador) Brinck (1958) and Connecticut Hitchcock (1968), which likely represent *A. atlantica* but were not confirmed in this study.

*Diagnosis:* *Alloperla atlantica* may be separated from *A. imbecilla* in the male adult stage by the detailed structure of the epiproct. The epiproct of *A. atlantica* has a naked apex (Figs. 9 & 10), while the epiproct of *A. imbecilla* has darkly sclerotized serrations on the dorsolateral margins of the apex (Figs. 3 & 4). The female adults are very similar and cannot always be separated with certainty. How-

ever, the subgenital plate of *A. atlantica* tends to be slightly longer and thinner with a more pointed apex as shown in Needham and Claassen (1925).

The female of *Alloperla usa* Ricker has a subgenital plate of similar shape but can be distinguished because of its larger size and the more flattened appearance of the projecting subgenital plate in lateral view. Ricker (1952) gives the length of *A. usa* females as 8.5–9.5 mm but most specimens are larger attaining up to 12 mm.

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